25. $e^x = 5.7$
26. $e^x = 0.83$
27. $5^x = 17$
28. $19^x = 143$
29. $5e^x = 23$
30. $9e^x = 107$
31. $3e^{5x} = 1977$
32. $4e^{7x} = 10{,}273$
33. $e^{1-5x} = 793$
34. $e^{1-8x} = 7957$
35. $e^{5x-3} - 2 = 10{,}476$
36. $e^{4x-5} - 7 = 11{,}243$
37. $7^{x+2} = 410$
38. $5^{x-3} = 137$
39. $7^{0.3x} = 813$
40. $3^{\frac{x}{7}} = 0.2$
41. $5^{2x+3} = 3^{x-1}$
42. $7^{2x+1} = 3^{x+2}$
43. $e^{2x} - 3e^x + 2 = 0$
44. $e^{2x} - 2e^x - 3 = 0$
45. $e^{4x} + 5e^{2x} - 24 = 0$
46. $e^{4x} - 3e^{2x} - 18 = 0$
47. $3^{2x} + 3^x - 2 = 0$
48. $2^{2x} + 2^x - 12 = 0$

Solve each logarithmic equation in Exercises 49–90. Be sure to reject any value of x that is not in the domain of the original logarithmic expressions. Give the exact answer. Then, where necessary, use a calculator to obtain a decimal approximation, correct to two decimal places, for the solution.

49. $\log_3 x = 4$
50. $\log_5 x = 3$
51. $\ln x = 2$
52. $\ln x = 3$
53. $\log_4(x + 5) = 3$
54. $\log_5(x - 7) = 2$
55. $\log_3(x - 4) = -3$
56. $\log_7(x + 2) = -2$
57. $\log_4(3x + 2) = 3$
58. $\log_2(4x + 1) = 5$
59. $5 \ln(2x) = 20$
60. $6 \ln(2x) = 30$
61. $6 + 2 \ln x = 5$
62. $7 + 3 \ln x = 6$
63. $\ln \sqrt{x + 3} = 1$
64. $\ln \sqrt{x + 4} = 1$
65. $\log_5 x + \log_5(4x - 1) = 1$
66. $\log_6(x + 5) + \log_6 x = 2$
67. $\log_3(x - 5) + \log_3(x + 3) = 2$
68. $\log_2(x - 1) + \log_2(x + 1) = 3$
69. $\log_2(x + 2) - \log_2(x - 5) = 3$
70. $\log_4(x + 2) - \log_4(x - 1) = 1$
71. $2 \log_3(x + 4) = \log_3 9 + 2$
72. $3 \log_2(x - 1) = 5 - \log_2 4$
73. $\log_2(x - 6) + \log_2(x - 4) - \log_2 x = 2$
74. $\log_2(x - 3) + \log_2 x - \log_2(x + 2) = 2$
75. $\log(x + 4) = \log x + \log 4$
76. $\log(5x + 1) = \log(2x + 3) + \log 2$
77. $\log(3x - 3) = \log(x + 1) + \log 4$
78. $\log(2x - 1) = \log(x + 3) + \log 3$
79. $2 \log x = \log 25$
80. $3 \log x = \log 125$
81. $\log(x + 4) - \log 2 = \log(5x + 1)$
82. $\log(x + 7) - \log 3 = \log(7x + 1)$
83. $2 \log x - \log 7 = \log 112$
84. $\log(x - 2) + \log 5 = \log 100$
85. $\log x + \log(x + 3) = \log 10$
86. $\log(x + 3) + \log(x - 2) = \log 14$
87. $\ln(x - 4) + \ln(x + 1) = \ln(x - 8)$
88. $\log_2(x - 1) - \log_2(x + 3) = \log_2\left(\frac{1}{x}\right)$
89. $\ln(x - 2) - \ln(x + 3) = \ln(x - 1) - \ln(x + 7)$
90. $\ln(x - 5) - \ln(x + 4) = \ln(x - 1) - \ln(x + 2)$

Practice Plus

In Exercises 91–100, solve each equation.

91. $5^{2x} \cdot 5^{4x} = 125$
92. $3^{x+2} \cdot 3^x = 81$
93. $2 |\ln x| - 6 = 0$
94. $3 |\log x| - 6 = 0$
95. $3^{x^2} = 45$
96. $5^{x^2} = 50$
97. $\ln(2x + 1) + \ln(x - 3) - 2 \ln x = 0$
98. $\ln 3 - \ln(x + 5) - \ln x = 0$
99. $5^{x^2-12} = 25^{2x}$
100. $3^{x^2-12} = 9^{2x}$

Application Exercises

Use the formula $R = 6e^{12.77x}$, where x is the blood alcohol concentration and R, given as a percent, is the risk of having a car accident, to solve Exercises 101–102.

101. What blood alcohol concentration corresponds to a 25% risk of a car accident?
102. What blood alcohol concentration corresponds to a 50% risk of a car accident?
103. The formula $A = 18.9e^{0.0055t}$ models the population of New York State, A, in millions, t years after 2000.
    a. What was the population of New York in 2000?
    b. When will the population of New York reach 19.6 million?
104. The formula $A = 15.9e^{0.0235t}$ models the population of Florida, A, in millions, t years after 2000.
    a. What was the population of Florida in 2000?
    b. When will the population of Florida reach 19.2 million?

In Exercises 105–108, complete the table for a savings account subject to n compoundings yearly $\left[A = P\left(1 + \frac{r}{n}\right)^{nt}\right]$. Round answers to one decimal place.

Amount Invested	Number of Compounding Periods	Annual Interest Rate	Accumulated Amount	Time t in Years
105. $12,500	4	5.75%	$20,000	
106. $7250	12	6.5%	$15,000	
107. $1000	360		$1400	2
108. $5000	360		$9000	4